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EFFECT OF TIN-PLATING UPON ADHESIVE BONDING OF POLYCARBOXYLATE --ETC(U)
MAY 79 L LORTON, B K MOORE, J W MORSE

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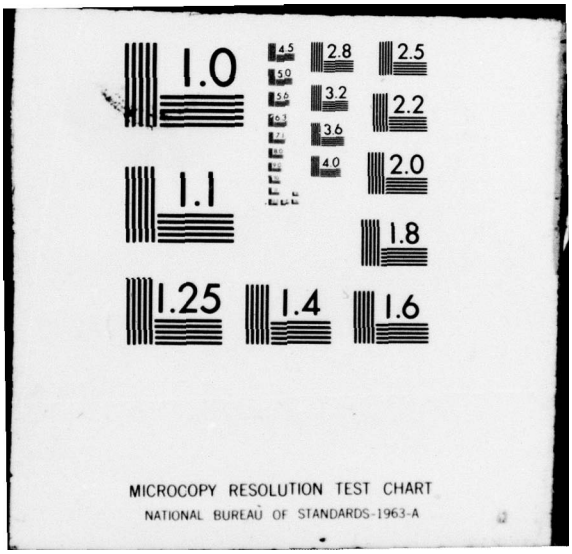
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It has been suggested that tin-plated gold surfaces would more easily be adhered to by polycarboxylate cement. Controlled tin plating studies were carried out to test this hypothesis. It was found that scrupulous cleaning of the gold surface produced adhesive bonding that equalled bond strength to tin plated surface. Cement failures were cohesive rather than adhesive suggesting that bond strengths approach cohesive strength of cement.

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EFFECT OF TIN-PLATING UPON ADHESIVE BONDING OF POLYCARBOXYLATE CEMENTS

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Although polycarboxylate cements have the ability to produce adhesive bonding to enamel, and to a lesser extent to dentin, the bonding to the gold casting is at best mechanical in nature. Furthermore, if the surface of the casting is not cleaned, e.g. by an airbrasive, after pickling, then even that mechanical retention of the cement to the casting is not attained (A. B. Ady and C. W. Fairhurst, *J Prostht Dent* 29:217, 1973). Thus, in order to realize the adhesive potential of this cement system in terms of total retention of the clinical casting, adhesive bonding at the cement-metal interface would be desirable. It has been suggested that this might be attained by tin-plating the cavity side of the casting (personal communication - J. W. McLean). The purpose of this investigation was to determine whether tin-plating of a gold alloy would improve the bond strength of a polycarboxylate cement.

The bond strength was determined in the manner described by Phillips and Swartz (L. M. Swartz; J. F. Johnston; and R. W. Phillips, *J Am Dent Assoc* 50:172, 1955) and the cleansing of the castings before plating followed the recommendation of McLean (J. W. McLean; E. E. Jeansonne; H. Bruggers; and D. B. Lynn, *J Prostht Dent* 40:273, 1978). The cleaning regimen prior to plating was: 1. sandblasting (50 u Al_2O_3); 2. 10 minutes in warm NaOH in ultrasonic bath (10% solution); 3. rinse in distilled H_2O; 4. rinse in 10% citric acid; 5. store in distilled water until plated.

Flat specimens (.39cm^2) were cast from a traditional crown and bridge gold alloy.* Eleven pairs served as the control, the surface being mechanically cleaned following pickling by sandblasting. The other eleven

*J. M. Ney Co., G-3, Type IV, Bloomfield, Connecticut

pairs were tin-plated in an acid sulfate solution. Before plating the specimens were oxidized in an oven to provide an oxide surface which would be more receptive to bonding. The plating procedure (J. W. McLean; E. E. Jeansonne; H. Bruggers; and D. B. Lynn, *J Prostht Dent* 40:273, 1978) was: 1. 1 minute @ 50 ma (130 mA/cm^2) in acid sulfate bath; 2. rinsed in distilled water; 3. heat treated at 500° C for 2 minutes in air.

The specimens were then cemented face to face, with a representative polycarboxylate cement,** mixed according to the manufacturer's directions, stored in water at 37° C for 30 days at which time the bond strength was determined by application of a tensile stress at .03 in/min. crosshead speed. The mode of failure was also noted as to whether it was cohesive or adhesive.

The results (Table I) indicate that no significant difference in bond strength existed between the controls and the plated specimens. Likewise the pattern of fracture, cohesive or adhesive, was comparable. The data also suggests that since the trend in both series was to cohesive or cohesive/adhesive failures then the bond strength of the cement to the gold approaches the strength of the cement. Although tin-plating of the casting did not enhance the bond strength of the carboxylate cement, it is a possible substitute for mechanical cleansing.

**Durelon, Premier Co., Philadelphia, Pennsylvania

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TABLE I

	Mean	S.D.	
Oxidized and plated	97.2 kg/cm^3	15.9 kg/cm^2	4 cohesive/adhesive 7 cohesive
Control	115 kg/cm^2	16.2 kg/cm^2	3 adhesive 5 cohesive/adhesive 3 cohesive

$t = 2.58$ - not significant at $p = .95$